SHUK MEI TSE

Optimization of Terminal Doppler Weather Radar at Hong Kong International Airport for microburst detection

smtse@webmail.hko.gov.hk

Authors

Shuk Mei / Tse, Hong Kong Observatory,

Occurrence of microbursts and low level windshear can affect safety of aircraft landing and departing an airport. In addition to severe thunderstorms which occur from time to time under the prevailing climate, hilly topography surrounding the Hong Kong International Airport (HKIA) renders the airport susceptible to occurrence of terrain induced windshear. The terrain-induced windshear sometimes results in head wind difference of more than 15 m/s, i.e. equivalent to the strength of a microburst. With the heavy air traffic, real-time windshear detection is vital to safeguard aviation safety.

A new Terminal Doppler Weather Radar (TDWR) was recently installed near HKIA to replace another TDWR which had been used for nearly 20 years and was aged. With lots of stationary and moving clutters around the airport, spectrum interpolation and Moving Target Adaptive Rejection Map were introduced and tested on-site for removing clutters. Hybrid multi-PRI method was used for de-aliasing radar velocity data with large gradients and random noise. Out-of-trip echoes were reduced by Normalized Coherent Power method. After system optimisation, a high detection accuracy was achieved. This paper will discuss spatial and temporal characteristics of the terrain-induced windshear and performance of the new TDWR for detecting severe terrain-induced windshear and microbursts during a typhoon event.